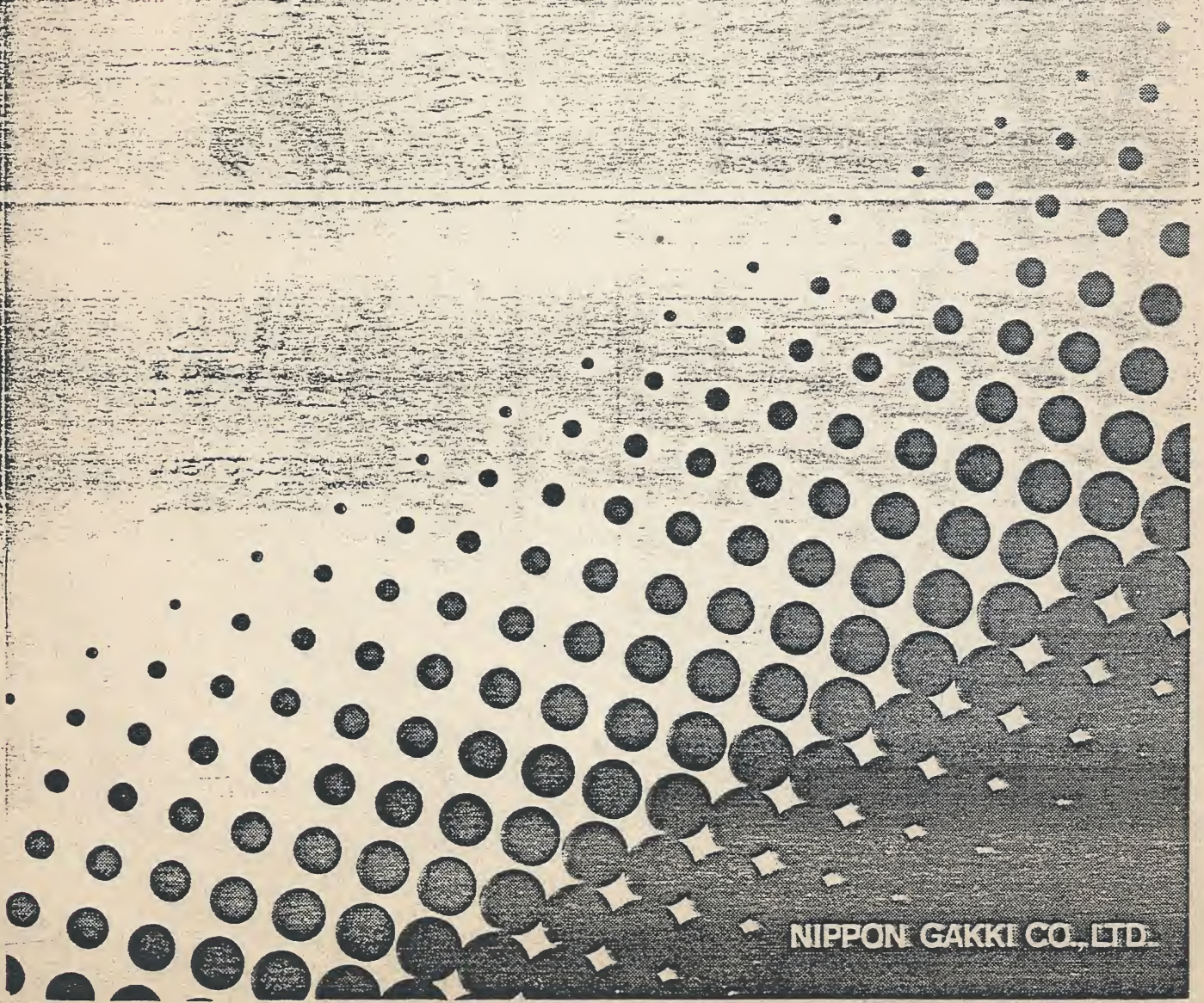
MSX

YAMAHA

Home Personal Computer

YIS503

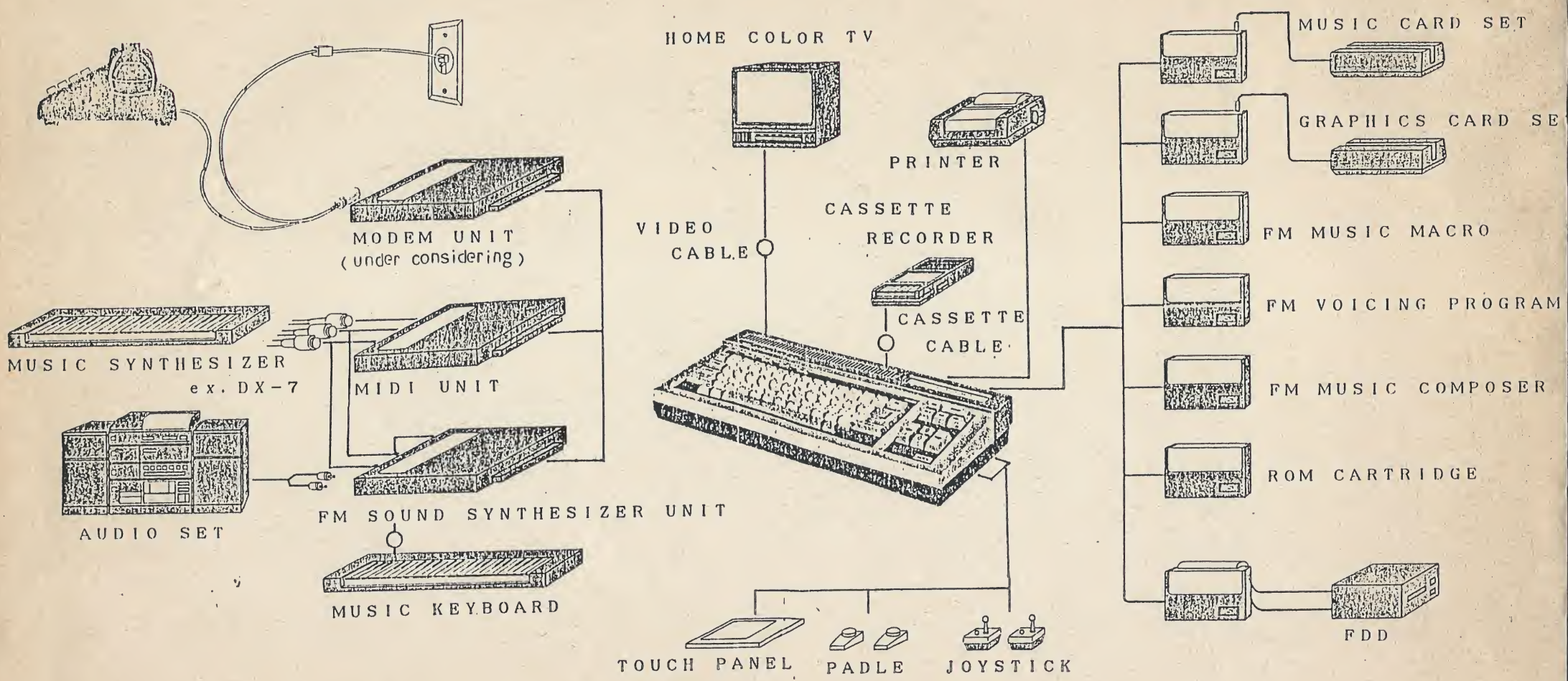
OWNER'S MANUAL



NIPPON GAKKI CO., LTD.

SYSTEM

YIS-503



TO BEGIN WITH.....

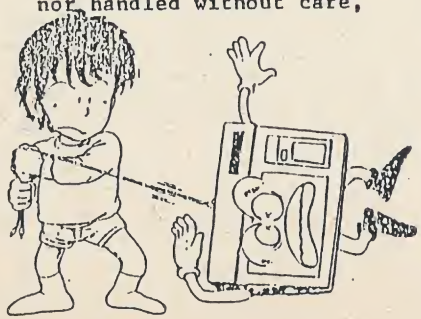
BEFORE USING.....

BEFORE USING PLEASE BE CAREFUL ABOUT THE FOLLOWING.....

If there is any trouble disconnect power immediately.

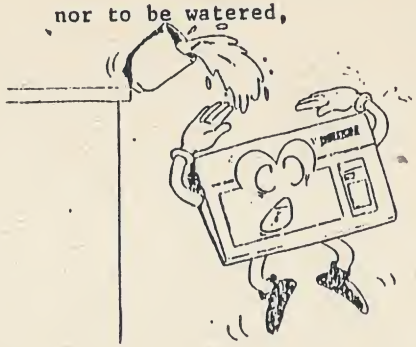
It does not want to be disassembled,

nor handled without care,

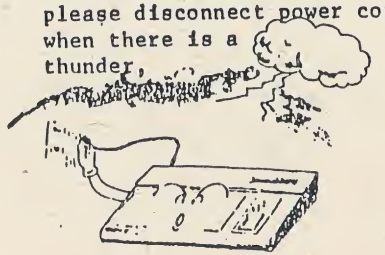


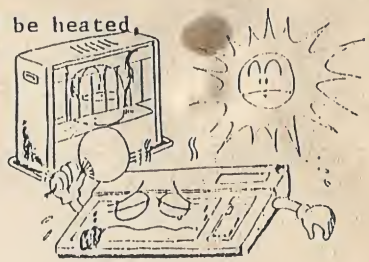
nor dropped,

nor to be watered,



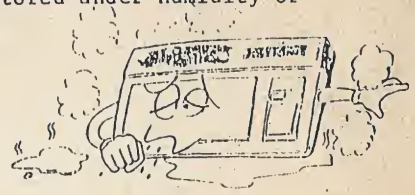
nor hit by lightening, please disconnect power cord when there is a thunder,



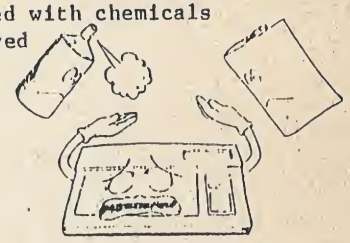


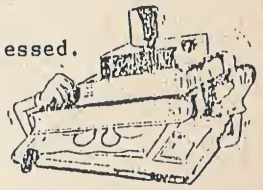
nor to be heated,

nor stored under humidity or dust,



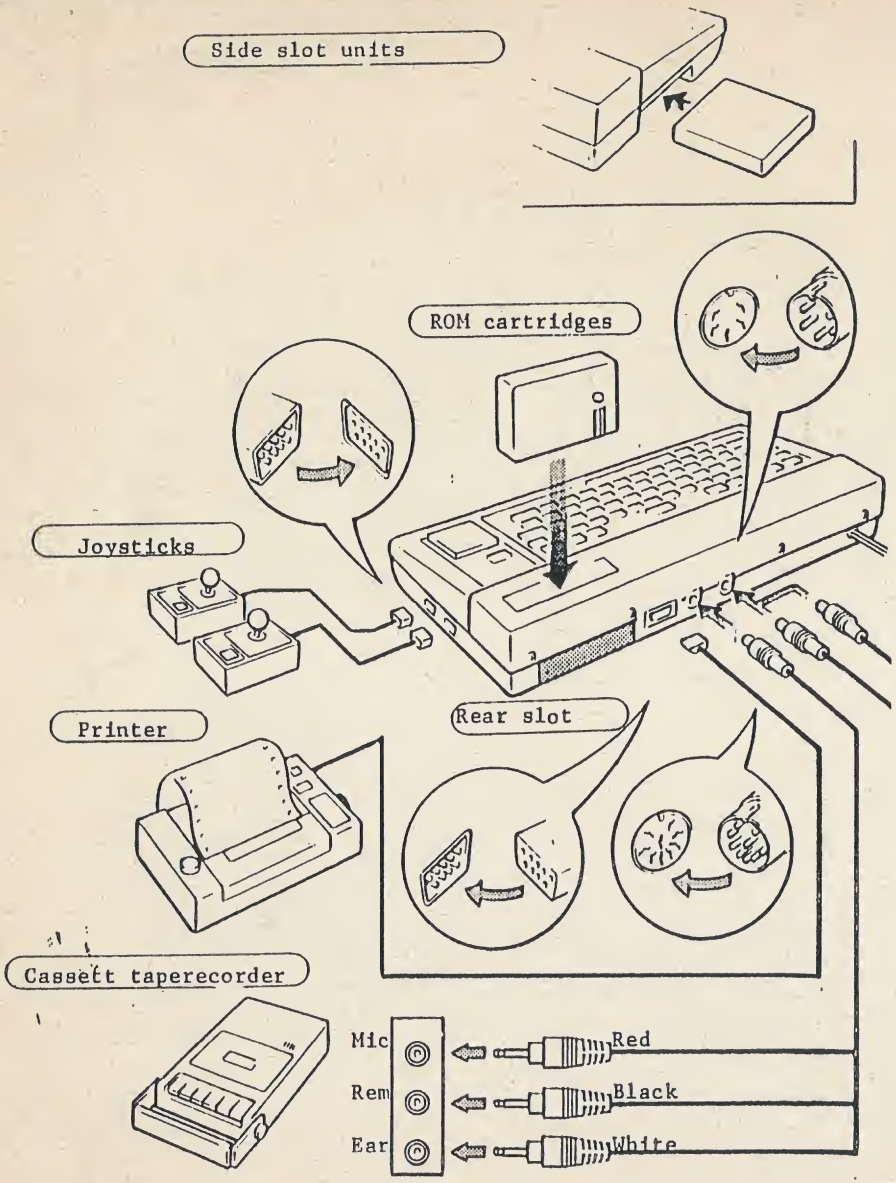
nor wiped with chemicals nor splayed

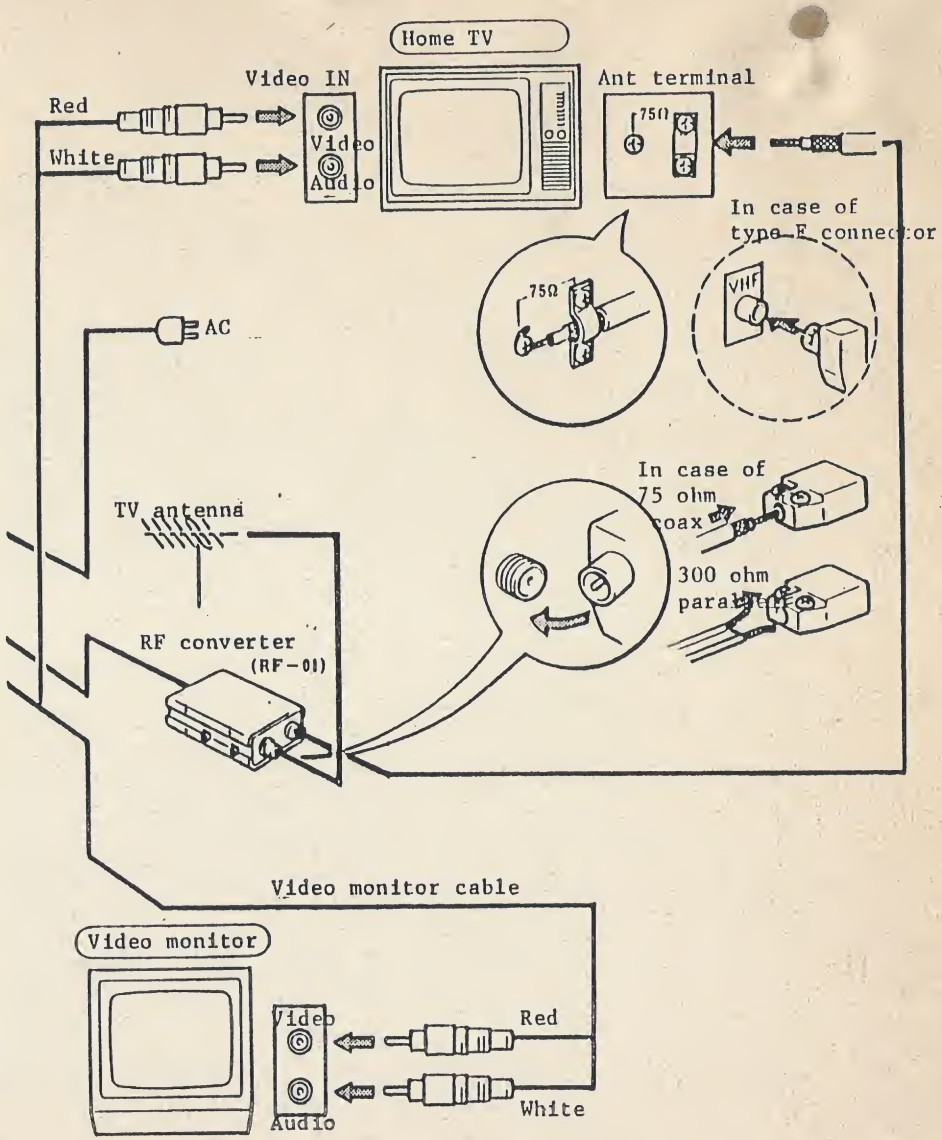


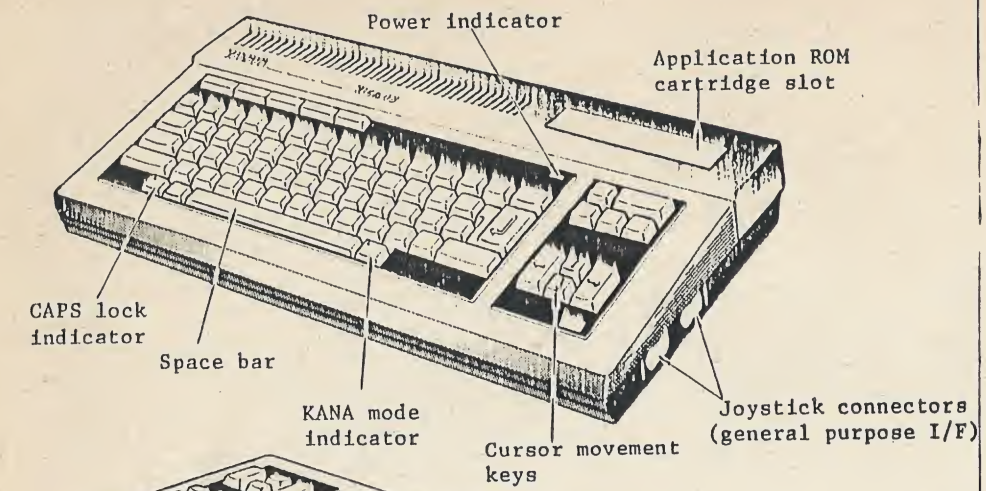


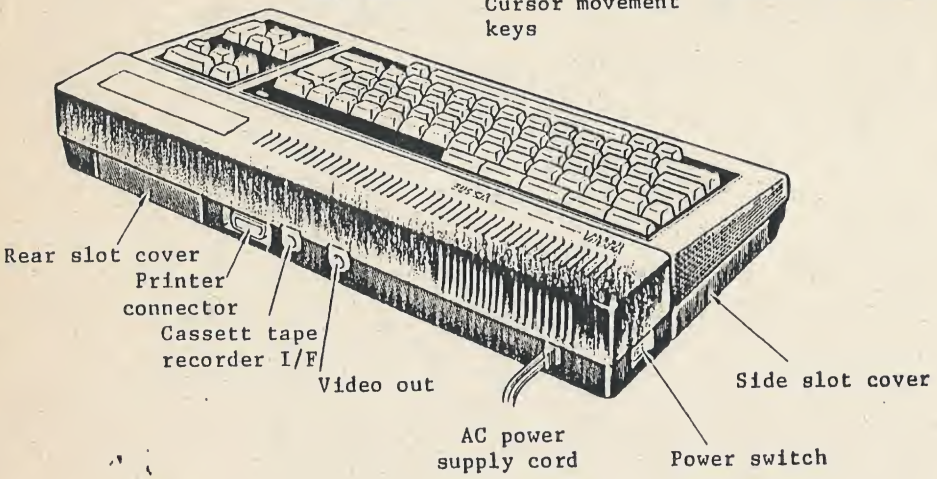
nor pressed.

PLEASE KEEP THIS HANDBOOK IN A SAFE PLACE FOR YOUR FUTURE REFERENCE.

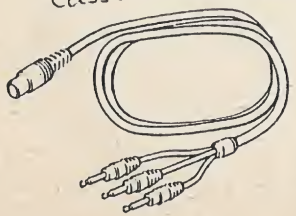

Side slot units
ROM cartridges
Joysticks
Printer
Rear slot
Cassett taperecorder
Mic
Rem
Ear
Red
Black
White

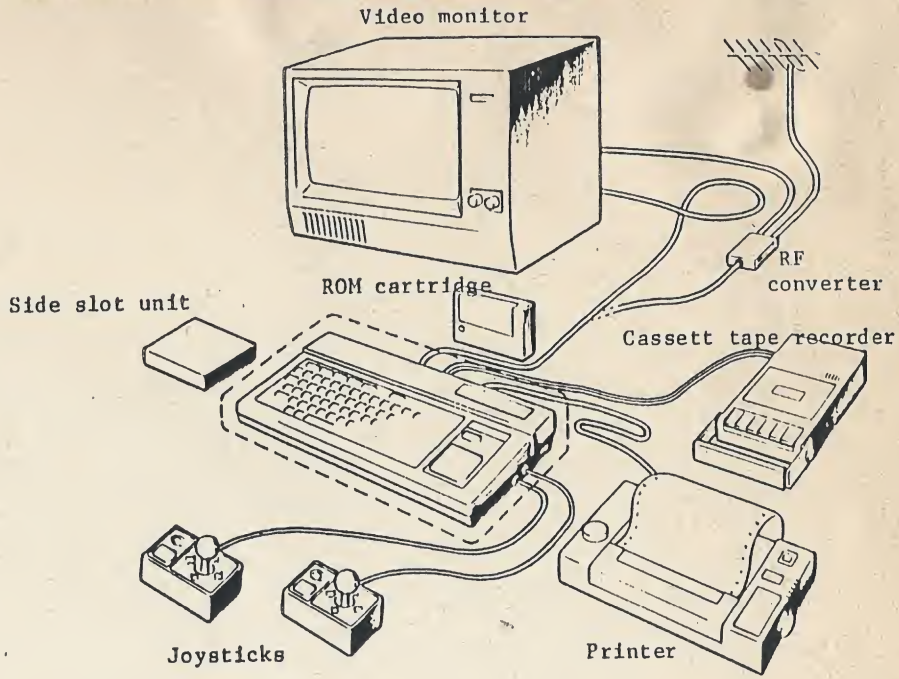

Home TV
Video IN
Red
White
Video
Audio
Ant terminal
75Ω
In case of type F connector
VHF
AC
TV antenna
In case of 75 ohm coax
300 ohm
RF converter
(RF-01)
Video monitor cable
Video monitor
Video
Audio
Red
White



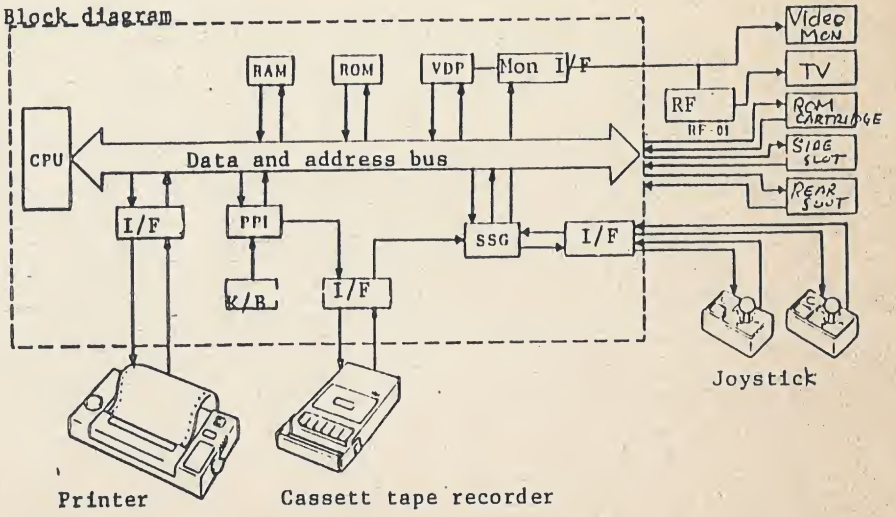


Cassett cable (Accessory)





Block diagram



OPERATION

BEFORE TURNING THE POWER ON

(1) Before connecti g the power cable to wall socket make sure all switches every units including MSX are in the OFF position.

WARNING - TURNING ON AND OFF THE CONNECTED PERIPHERALS MAY CAUSE AN OPERATION ERROR OF THE MSX IF THE MSX IS LEFT ON. SHOULD THE OPERATION ERROR TAKE PLACE TURN THE MSX OFF ONCE AND WAIT FOR ABOUT 30 SECONDS BEFORE TURNING ON AGAIN.

(2) Turn the TV or video monitor on.

Note - In case of home TV is used please use the RF converter and set the channel of the TV to 1 or 2 (whichever is not in use.)

(3) Turn the power to other peripherals.

(4) Turn the power to the MSX. If ROM cartridge is not inserted the following message appears, and shows the BASIC is in operation.

Note - The message differs according to the application program in the ROM cartridge slot. Please consult the instruction sheet or manual attached to the program in case such is in use.

(5) Should the message does not appear correctly, turn the power to the MSX off once, wait for a while then turn the power on again. If the message still does not appear correctly please check the following.

1. If all the connecting cables are correctly connected.
2. If the power to video monitor or TV is correctly fed.
3. Is brightness and contrast on your TV correctly adjusted?
4. In case of the home TV is used, please readjust the fine tuning.

(SAMPLE OF CORRECT MESSAGE)

```
MSX BASIC version 1.0
Copyright 1983 by Microsoft
28943 Bytes free
Ok
```

HOW TO USE THE ROM CARTRIDGE

WARNING - TURN THE POWER TO THE MSX OFF WHEN INSERTING AND REMOVING A ROM CARTRIDGE.
BEWARE THAT ALL INFORMATION THAT ARE WRITTEN IN THE MAIN MEMORY WILL BE CLEARED WHEN THE POWER TO THE MSX IS TURNED OFF.

(1) Rom cartridge slot is located at the top right section of the MSX. Align the direction correctly and insert firmly.

(2) The ROM cartridge slot is covered by a protective cover, push the protective cover in and insert the ROM cartridge to the slot then turn the power to the MSX on.

(3) Please consult the instruction manual attached to the ROM cartridge for operation of the application program and message appears on the screen.

HOW TO USE THE SIDE SLOT EXTENSION UNIT

WARNING - PLEASE TURN THE POWER OFF WHEN INSERTING AND REMOVING THE SIDE SLOT EXTENSION UNIT

(1) Side slot is located on the left side of the MSX. Direct the side slot unit correctly insert firmly.

(2) There are several side slot extension unit available from YAMAHA.

(3) Turn the power to the MSX on.

(4) Please consult the instruction manual attached to the side slot unit for operation.

HOE TO USE MSX KEYBOARD

MSX has the ASCII standard keyboard. Each key has the auto repeat function and repeats a letter after about one second if the key is pressed continuously.

ESC

This key does not have any assignment on default status.

TAB

This key advances the cursor by 8 steps.

CTRL

This key can be used in conjunction with the alpha keys to operate the control fuctions.

SHIFT

This key can be used in conjunction with any other key to produce the uppercase letters or the key's alternate definitions.
If the GRAPF key is in PRESSED status it does not any function at all.

CAPS

This is the caps lock key. When CAPS indicator lamp is on uppercase letters will be produced. It alternates with each press.

GRAPH

If this key is pressed in conjunction with any ither key various graphic patterns will be produced.

F1 -- F10 (Function keys)

These are the programmable function keys and operate as are indicated on the bottom of the screen when the power to the MSX is turned on.
The statesment KEY will redefine the function keys.

COLOR	AUTO	GOTO	LIST	RUN

In conjunction with SHIFT .

COLOR(15,4,7)	CLOAD	CONT	LIST	(CLS)RUN

STOP

If pressed in conjunction with CTRL key, program operation will interrupt.

HOME

If pressed in conjunction with SHIFT key screen clears and the cursor will return to its home position (top left corner of screen).

INS

It is an INSERT key. If INS kwy is pressed cursor changes to small cursor and you can insert any letter between the letter on the left of cursor and the one on the cursor. If INS key is pressed again or RETURN or SPACE BAR is pressed, INS mode is released.

DEL

It is the DELETE key. When DEL key pressed the letter on the cursor deletes and the letters to the right of the cursor moves one step to the left.

BS

It is the BACK SPACE key. When this key is pressed cursor moves to the left and deletes the letters.

SELECT

This key is used in an application program. Please consult the instruction manual attached to the application program.

CURSOR MOVEMENT KEY

Cursor moves toward the direction indicated by arrow (↖).

RETURN

If this key is pressed, cursor moves one line and returns to the left position to begin a new line.
It is also functions to tell MSX to store line number and statement into memory.

HOW TO USE A CASSETT DATA RECORDER

(1) How to connect the casset tapa recorder to the MSX

Please see 'CONNECTION WITH ACCESSORIES' section carefully. If your cassett tape recorder does not have a REMOTE connector leave the REMOTE plug out.

(2) LOAD LEVEL adjustment

Set the volume control at slightly larger than midpoint. If your taperecorder has a tone control please set it at sightly more than midpoint.

(3) How to load a program from your cassett tape

1. Mount your cassett tape to your data recorder.
2. Set the data recorder at the PLAY position.
3. (note) If your tape recorder does not have a REMOTE connector skip to procedures 3 and 4 then press PLAY button.
3. Press SHIFT F7. The screen will show 'cload"'.
4. Input the name of program after 'cload"' (usually name of the program is indicated on your application program package,) then press RETURN.
   (example) If your game program is titled 'GAME1' whole message should show like this;
   cload"GAME1
   then RETURN .
5. There is one click noise then the tape recorder will start playing.(This is the case when the REMOTE connection is used.
   (WARNING) PROGRAM NAME MUST BE TYPED IN AS IS WRITTEN ON THE LABEL(A space and a character must be typed in as it is indicated, otherwise program will not run ploperly.)
6. When MSX finds a program, MSX will indicate on the screen like this;
   Found:GAME1
   then read the program into MSX memory.
   When MSX has read the program completely MSX will indicate an Ok.
7. When MSX finds a different program it will indicate 'skip"' then a program name. And contnues to search the correct program name.

(4) When you do not have the program name you want.

1. Tell MSX 'cload' then prenn RETURN.
   MSX will indicate the first program saved on the tape.
2. If you want to know every program names you can type in an arbitrary file name (such as DON'TKNOW). In this case MSX will show all program names with 'skip:' message unless it finds the program name 'DON'TKNOW'.

(5) How to save a program

(note) ALL PROGRAMS WRITTEN ON THE RAM AREA WILL BE ERASED WHEN THE POWER TO THE MSX IS SHUT OFF. PROGRAM HAVE TO BE SAVED ON THE CASSETT TAPE IN ORDER TO BE KEPT.

1. Mount the cassett tape on the tape recorder.
2. Press the record and the play buttons simultaneously to set the tape recorder in the RECORDING status.
   If your tape recorder does not have a REMOTE on it this procedure must be taken , in the process 3, before pressing RETURN after the program name is typed in.
3. Please type the program name after the command 'csave"'.
   For example;
   csave"GAME2

then press RETURN.
(note) program name must be within 6 letters of alphabet or numerical.

4. Thre is one click noise and then the tape recorder starts to save the program.
   (if the REMOTE in connected.)
5. When the tape recorder finishes to save the program the tape recorder will stop automatically and the MSX will indicate Ok.
   (If the REMOTE is not provided the tape recorder does not stop automatical-ly. Please stop the tape recorder when the message Ok is indicated on the screen.)
   (note) Varuable program should be saved on two cassett tapes for in case an accident.

6. When the program is saved completely please verify by the following procedure if the program is saved properly.
   Type in command CLOAD 'CLOAD?"',then program name like this;
   CLOAD CLOAD?"sample
   then MSX will indicate
   Found:sample
   if it finds the correct program name.
   If the program is correctly saved MSX will indicate
   Ok
   then the tape stops.
   If the program is not correctly saved it will indicate
   Verify error
   Ok

In this case the program must be saved again.
(WARNING) DO NOT LOAD THE PROGRAM INTO PROGRAM RAM AREA TO VERIFY, THE LOADING OF THE PROGRAM INTO THE RAM AREA WILL DESTROY ALL INFORMATION STORED IN THE RAM.

6. How to cange the BAUD RATE on the tape.
   Tape cassett baud rate may be programmable by software.

```
csave"name of program
xxxxx csave"name of program",0   } ...... 1200bps

csave"name of program",1          ...... 2400bps
```

SPECIFICATIONS

1) CPU

Z80A (Clock frequency 3.579545MHz)

2) Memory

Main memory	32 K-bytes
Video RAM	16 K-bytes
ROM	32 K-bytes

3) Keyboard

73 keys(JIS standard)

Alpha-numeric keys, graphic characters and KANA keys	x 49
Control codes, etc.	x 15
Cursor movement keys	x 4
Function keys	x 5

LED indicators for CAPS lock and KANA mode

4) Video out specifications

Characters;	Alpha-numeric, Hirakana, Katakana and graphic patterns 256 characters with 8 x 8 dots matrics
Color graphics;	16 colors with the resolution of 256 x 192 (typical) 32 sprites

5) Music function

8 octave 3 notes and noise

6) Cassett data recorder interface

FSK 1200 BPS or 2400 BPS
8 pin DIN connector

Pin #	Signal
1	GND
2	GND
3	GND
4	CMTOUT
5	CMTIN
6	REM+
7	REM-
8	GND

7) Video/audio out

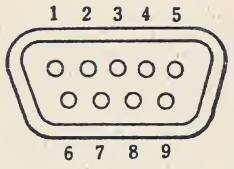
NTSC composite out (video)
5 pin DIN connector

Pin #	Signal
1	+5 V
2	GND
3	SOUND
4	VIDEO
5	NC

8) Joystick interface

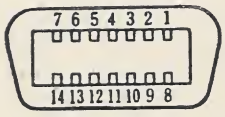
9 pin type-D connector x 2
TTL connection

Pin #	Signal	Connection
1	FWD	
2	BACK	
3	LEFT	
4	RIGHT	
5	+5 V	
6	TRG1	
7	TRG2	
8	OUT	
9	GND	



9) Printer interface
8 bits parallel centronics
14 pins TTL connection

Pin #	Signal	Connection
1	PSTB	
2	PDB0	
3	PDB1	
4	PDB2	
5	PDB3	
6	PDB4	
7	PDB5	
8	PDB6	
9	PDB7	
10	NC	
11	BUSY	
12	NC	
13	NC	
14	GND	



10) ROM cartridge slot (game slot)

No	名 称	I/O	No	名 称	I/O	No	名 称	I/O
1	$\overline{CS1}$	O	2	$\overline{CS2}$	O	3	$\overline{CS12}$	O
4	$\overline{SLTSL}$	O	5	予備※	—	6	$\overline{RFSH}$	O
7	$\overline{WAIT}$	I	8	$\overline{INT}$	I	9	$\overline{M1}$	O
10	$\overline{BUSDIR}$	I	11	$\overline{IORQ}$	O	12	$\overline{MERQ}$	O
13	$\overline{WR}$	O	14	$\overline{RD}$	O	15	$\overline{RESET}$	O
16	予備※	—	17	A 9	O	18	A15	O
19	A11	O	20	A10	O	21	A 7	O
22	A 6	O	23	A12	O	24	A 8	O
25	A14	O	26	A13	O	27	A 1	O
28	A 0	O	29	A 3	O	30	A 2	O
31	A 5	O	32	A 4	O	33	D 1	I/O
34	D 0	I/O	35	D 3	I/O	36	D 2	I/O
37	D 5	I/O	38	D 4	I/O	39	D 7	I/O
40	D 6	I/O	41	GND	—	42	CLOCK	O
43	GND	—	44	SW1	—	45	+5V	—
46	SW2	—	47	+5V	—	48	+12V	—
49	SUNDIN	I	50	−12V	—			

MSX standard 50 pin connector

11) Extention side slot pin assignment (60 pin connector)

No.	名 称	I/O	No.	名 称	I/O	No.	名 称	I/O
1	SOUND OUT	O	2	GND		3	GND	—
4	Phase Control	I	5	Y	O	6	B−Y	O
7	C VIDEO	O	8	R−Y	O	9	EXT CLOCK	I
10	CLOCK INT/EXT	I	11	$\overline{CS1}$	O	12	$\overline{CS2}$	O
13	$\overline{CS12}$	O	14	$\overline{SLTSL}$	O	15	予備※	—
16	$\overline{RFSH}$	O	17	$\overline{WAIT}$	I	18	$\overline{INT}$	I
19	$\overline{M1}$	O	20	NO CONNECTION	—	21	$\overline{IORQ}$	O
22	$\overline{MERQ}$	O	23	$\overline{WR}$	O	24	$\overline{RD}$	O
25	$\overline{RESET}$	O	26	予備※	—	27	A 9	O
28	A 15	O	29	A 11	O	30	A 10	O
31	A 7	O	32	A 6	O	33	A 12	O
34	A 8	O	35	A 14	O	36	A 13	O
37	A 1	O	38	A 0	O	39	A 3	O
40	A 2	O	41	A 5	O	42	A 4	O
43	D 1	I/O	44	D 0	I/O	45	D 3	I/O
46	D 2	I/O	47	D 5	I/O	48	D 4	I/O
49	D 7	I/O	50	D 6	I/O	51	GND	—
52	CLOCK	O	53	GND	—	54	SW1	—
55	+5V	—	56	SW2	—	57	+5V	—
58	+12V	—	59	SOUND IN	I	60	−12V	—

12) Rear slot pin assignment (based on MSX stand rd- 50 pins)

No.	名 称	I/O	No.	名 称	I/O	No.	名 称	I/O
1	$\overline{CS1}$	O	2	$\overline{CS2}$	O	3	$\overline{CS12}$	O
4	$\overline{SLTSL}$	O	5	予備※	—	6	$\overline{RFSH}$	O
7	$\overline{WAIT}$	I	8	$\overline{INT}$	I	9	$\overline{M1}$	O
10	$\overline{BUSDIR}$	I	11	$\overline{IORQ}$	O	12	$\overline{MERQ}$	O
13	$\overline{WR}$	O	14	$\overline{RD}$	O	15	$\overline{RESET}$	O
16	予備※		17	A 9	O	18	A 15	O
19	A 11	O	20	A 10	O	21	A 7	O
22	A 6	O	23	A 12	O	24	A 8	O
25	A 14	O	26	A 13	O	27	A 1	O
28	A 0	O	29	A 3	O	30	A 2	O
31	A 5	O	32	A 4	O	33	D 1	I/O
34	D 0	I/O	35	D 3	I/O	36	D 2	I/O
37	D 5	I/O	38	D 4	I/O	39	D 7	I/O
40	D 6	I/O	41	GND	—	42	CLOCK	O
43	GND	—	44	SW1	—	45	+5V	—
46	SW2		47	+5V	—	48	+12V	—
49	SUNDIN	I	50	−12V	—			

13)General specifications

AC power supply; AC 100 V 10 % 50/60 Hz
Power consumption; max 27 Watts
Operation condition; temperature 0-35 C
humidity L/T 80 %
Dimensions; 423W x 68H x 208D (M/M)
Weight; 2.0 Kg